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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/489,144	01/21/2000	Nan-Xing Hu	D/99136	5415

7590

11/27/2002

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EXAMINER

GARRETT, DAWN L

ART UNIT

PAPER NUMBER

1774

DATE MAILED: 11/27/2002

14

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-14

Office Action Summary

Application N .

09/489,144

Applicant(s)

HU ET AL.

Examin r

Dawn Garrett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2002 .
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 25-43 is/are pending in the application.
- 4a) Of the above claim(s) 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19, 25-37 and 39-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____ .
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
- ☐ Interview Summary (PTO-413) Paper No(s). _____ .
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____ .

1. In view of the Appeal Brief filed on September 12, 2002, PROSECUTION IS HEREBY REOPENED.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

2. Applicant's amendment after final rejection, paper no. 8, dated March 22, 2002 has now been entered. Claims 10, 42, and 43 were amended. Claims 1-19 and 25-43 are pending. Claim 38 is currently withdrawn as non-elected.

3. The rejection of claims 29, 30, 36, and 37 under 35 USC 112, second paragraph, as set forth in paper no. 5, paragraph 6, is withdrawn.

4. The rejection of claims 10-19, 25, 26, 42, and 43 under 35 USC 102(b) as being anticipated by Bosch is withdrawn.

5. The rejection of claims 1-9 and 27-41 under 35 USC 103(a) as being unpatentable over Bosch in view of Mori is withdrawn.

6. The rejection of claims 29, 30, 36, and 37 under 35 USC 112, first paragraph, set forth in paper no. 7, paragraph 10, is maintained.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-9, 27, 28, 31-35, and 39-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claims 1, 31, and 35 recite the limitation "the hole transport layer". There is insufficient antecedent basis for this limitation in the claim.

10. Claims 31 and 35 recite "the electron transport layer", but "the electron layer" is not clearly recited previously in the claim. Earlier, the claim recites "wherein said triazine functions as an electron transport, an electron injector, or simultaneously as an electron transport and an electron injector". There is not clear antecedent basis for "the electron transport layer" later in the claim.

11. Claim 19 states the buffer layer is "**optionally** doped" with stabilizer, but then recites the stabilizer is present "in amount of from about 0.5 to about 10 weight percent". These two limitations are conflicting. Clarification is required.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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13. Claims 1-19, 25-37, and 39-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fink et al. (US 6,352,791, the US equivalent of PCT/DE97/01269 to Robert Bosch GmbH) in view of Tang et al. (US 6,048,573). (The examiner notes applicant's elected triazine species comprises a multivalent aromatic group with at least two fused aromatic groups as the "A" group, phenyl as the "Ar¹" group, and phenyl as the "Ar²" group as set forth in paper no. 4, mailed July 25, 2001. Applicant selected ultimate species compound II-1, which is 2,4,6-tris-(4-biphenyl)-1,3,5-triazine.) Fink et al. teaches an electroluminescent device comprising triazine compounds as an electron-conducting layer (see abstract). The layers of the electroluminescent device depicted Figure 1 are the following:

- 1) substrate
- 2) anode
- 3) hole injection layer
- 4) hole conducting layer
- 5) light emitting layer
- 6) electron conducting layer
- 7) electron injecting layer
- 8) cathode
- 9) encapsulation protective covering (see description of drawings)

With regard to instant Formula (I) and applicant's elected species, Fink describes triazines according to the instant formula as an electron conducting layer. R groups on the triazine skeleton include phenyl groups as well as fused aromatic rings (see col. 2

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through col. 9, line 40). With regard to claims 7 and 16, it is noted that L, R', and R'' are not required. With regard to claims 18 and 19, it is noted that the buffer layer is optional. Alq₃ is taught as light emitting material (see col. 11, electroluminescent structure (B)). The Fink anode is composed of ITO and the cathode is comprised of aluminum (see col. 9, line 64 through col. 10, line 3).

Although Fink et al. describes the use of a light emitting layer such as Alq₃ in the electroluminescent device, the reference fails to disclose the light emitting layer may further comprise a fluorescent dye. Tang et al. teaches, in analogous art, doping of a light-emitting layer with one dopant or more to modify the color and efficiency of light emitted from the light-emitting layer (see abstract). The Tang EL device comprises a hole transporting layer, a light-emitting layer and an electron-transporting layer (see col. 5, lines 8-11). The dopants for the light-emitting layer may include coumarin dyes as well as other dyes (see col. 6, lines 42-46). Tang further teaches a desired dopant concentration range is 10⁻³ to 10 mole percent (see col. 2, lines 1-4). Because Tang teaches doping a light-emitting layer with dopant at an amount of 10⁻³ to 10 mole percent is commonly used in the art and improves efficiency of an EL device, one of ordinary skill in the art would have been motivated to have used a dye doped light-emitting layer in the Fink EL device.

Fink exemplifies an anode of 80 nm thickness, a tertiary aromatic amine layer of 80 nm (per the instant buffer layer), and a triazine layer of 30nm (see pages 9 through 10, example 1). Claim 29 recites a cathode that is about 10-800 nanometers; Fink fails to teach a thickness range for making the cathode comprised of aluminum per claims

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29, 30, 36, and 37. Tang et al. teaches in analogous art a thin film organic light-emitting device comprising a cathode that is 150nm thick (see col. 9, lines 62-65). It would have been obvious to have formed the Fink cathode at a thickness of 150 nm, because Tang et al. teaches a cathode of this thickness conducts well in a thin film organic light-emitting device comprising a doped light-emitting layer.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (703)305-0788. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on (703) 308-0449. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2351.

D.G.
November 24, 2002

CYNTHIA M. KELLY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

